/Rei Tsang Shiao/ (07/28/2008)

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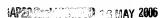
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Process for the preparation of mono- and bis(fluoroalkyl)phosphoranes and the corresponding acids and phosphates

This application is a 371 of PCT?EP04/11940 filed on 10/22/2004.

The present invention relates to a process for the preparation of mono-

(fluoroalkyl) or bis(fluoroalkyl)phosphoric acids, mono(fluoroalkyl) or bis(fluoroalkyl) phosphates and the corresponding phosphoranes thereof.

A process known from the prior art for the synthesis of fluoroalkylphosphoranes is based on the electrochemical Simons fluorination (ECF) of alkylphosphines (N. Ignatyev, P. Satori, *J. of Fluorine Chem.*, 103 (2000) 57-61; WO 00/21969) and, owing to the high yields, is particularly suitable for the synthesis of tris(fluoroalkyl)difluorophosphoranes. In the electrochemical fluorination of dialkylphosphines having short alkyl chains (having less than C₄), the yield of the corresponding perfluorinated phosphoranes is significantly lower.

The tris(fluoroalkyl)difluorophosphoranes can be used as starting materials for the synthesis of various phosphates (WO 98/15562, DE 196 41 138, EP 1 127 888) and a novel tris(fluoroalkyl)trifluorophosphoric acid (DE 101 30 940). This acid can be used not only for the synthesis of various salts, but can also be hydrolysed to give the corresponding bis(fluoroalkyl)phosphinic acid (DE 102 169 97). Bis(fluoroalkyl)phosphonic acid and salts thereof can also be obtained by hydrolysis of tris(fluoroalkyl)difluorophosphoranes (DE 102 169 95).

A process known from the prior art for the preparation of mono(perfluoroalkyl)- and bis(perfluoroalkyl)fluorophosphoranes is furthermore a multistep reaction based on the reaction between phosphorus and perfluoroalkyl halides, which are very expensive (T. Mahmood, J.M. Shreeve, Inorg. Chem., 25 (1986) 3128). This reaction frequently requires high pressures and temperatures.